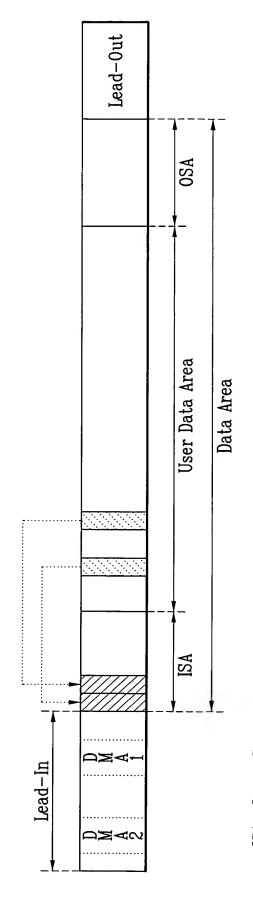
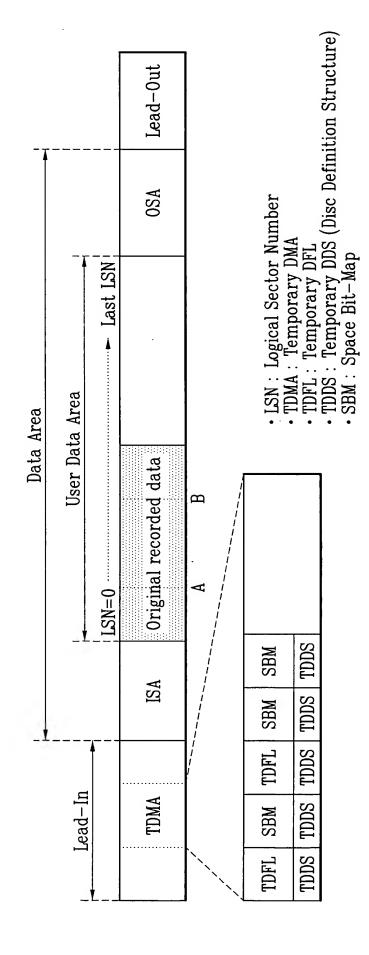
FIG. 1 Related Art



ISA: Inner Spare AreaOSA: Outer Spare AreaDMA: Defect management Area

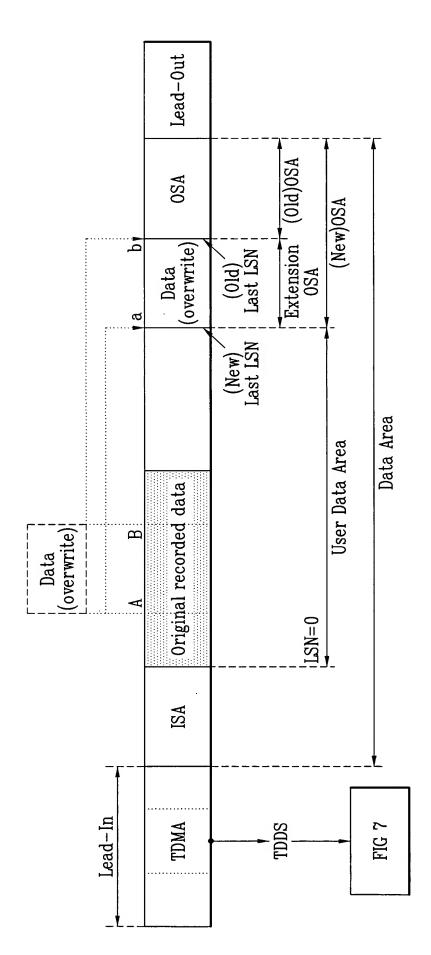
Defective cluster in User Data AreaReplacement cluster in Spare Area

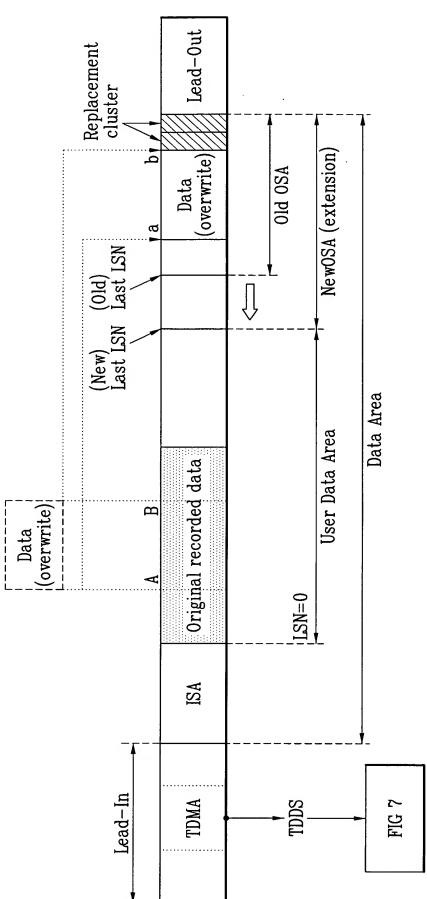
FIG. 2



Lead-Out FIG 3B 0SA (old) Last LSN Data (overwrite) b (Old) Last LSN (New) / Last LSN Data Area User Data Area FIG. 3A FIG. 3B Original recorded data | Data |(overwrite) В 1 cluster (New) a Last LSN ISN=0 ISA Lead-In TDMA TDDS FIG 7

FIG. 4





0SA Ď, Data (overwrite) ಥ FIG. 6 Original recorded data | Data |(overwrite) Д ISA Lead-In TDMA

Lead-Out Last LSN Last LSN of usable user data area Data Area User Data Area ISN=0 TDDS FIG 8

FIG. 7

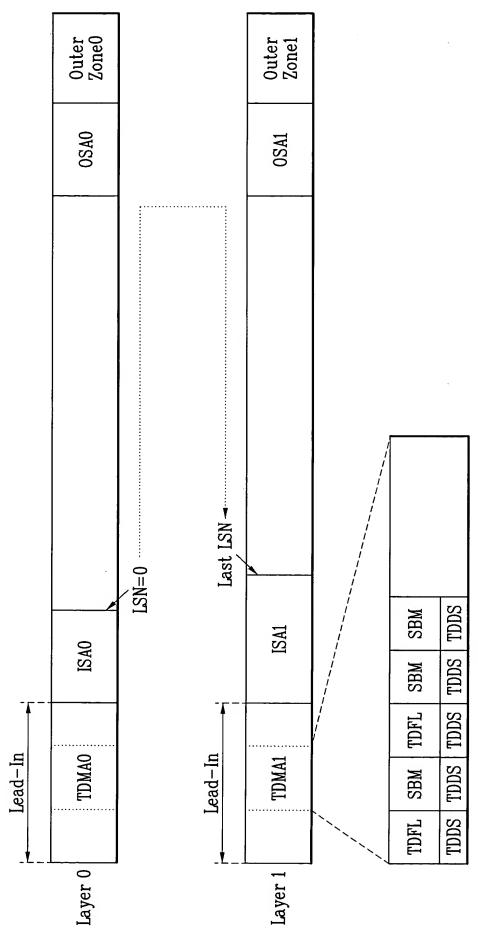
TDDS

TDDS identifier = "TDS"
TDDS update counter
•
Location LSN=0 of User Data Area
Location (new) Last LSN of User Data Area

FIG. 8

TDDS

TDDS identifier = "TDS"
TDDS update counter
•
Location LSN=0 of User Data Area
Location Last LSN of User Data Area
Location Last LSN of usable User Data Area



Outer Zone0 Outer Zone1 OSA0 0SA1 (Old) (New)
Last LSN Last LSN -Data (overwrite) \Box Original recorded data p Data (overwrite) ပ LSN=0 ပ ISA1 ISA0 Lead-Out TDMA0 Lead-In TDMA1 FIG 7 TDDS Layer 0 Layer 1

FIG. 10

Outer Zone0 Outer Zone1 OSA0 0SA1 Last LSN -Last LSN of usable user data Area Data (overwrite) Original recorded data FIG. 11 Data (overwrite) ပ ISN=0 ပ **ISA1** ISA0 Lead-Out TDMA0 Lead-In TDMA1 FIG 8 TDDS Layer 0 Layer 1

Outer Zone0 Outer Zone1 OSA0 OSA1 (New) (old)
Last LSN Last LSN
of Layer 0 of Layer 0 Data 1 (overwrite) þ ಥ (New) Last LSN of Layer 1 Data 2 (overwrite) Original recorded data FIG. 12 B Data 2 (overwrite) Data 1 (overwrite) I.SN=0 (01d) Last LSN of Layer 1 ¥ ပ ISA1 ISA0 Lead-Out TDMA0 Lead-In FIG 14 TDMA1 TDDS Layer 0 Layer 1

Outer Zone0 Outer Zone1 0SA0 0SA1 . Р Data 1 (overwrite) **A** Last LSN of usable user data Area of Layer 0 Last LSN of usable user data Area of Layer1 Data 2 (overwrite) Original recorded data FIG. 13 ပ Data 2 (overwrite) Data 1 (overwrite) М I.SN=0 Last LSN ISA1 ISA0 TDMA0 Lead-Out Lead-In TDMA1 TDDS Layer 0 Layer 1

FIG 15

FIG. 14

TDDS

TDDS identifier = "TDS"
TDDS update counter
•
Location LSN=0 of User Data Area
Location (new) Last LSN of User Data Area of Layer 0
Location (new) Last LSN of User Data Area of Layer 1
:

FIG. 15

TDDS

<u> 1886</u>
TDDS identifier = "TDS"
TDDS update counter
i:
Location LSN=0 of User Data Area
Location Last LSN of User Data Area of Layer 0
Location Last LSN of User Data Area of Layer 1
Location Last LSN of usable User Data Area of Layer 0
Location Last LSN of usable User Data Area of Layer 1
<u>:</u>

FIG. 16

